International Journal of Modern Physics A 2002 vol.17 N29, pages 4365-4374

Some remarks on topological defects and their gravitational consequences

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Abstract

We calculate the energy radiated by a uniformly moving charged scalar particle in the spacetime of a point-like global monopole, for small solid angle deficit. We show that this energy is proportional to the cube of the velocity of the particle and to the cube of the Lorenz factor, in the non-relativistic and ultra-relativistic cases, respectively. We also determine the energy shifts of a hydrogen atom placed in the background spacetime of a cosmic string and we discuss the possibility that these shifts could provide a means of probing for the presence of this topological defect in the Universe.

http://dx.doi.org/10.1142/S0217751X02013435

Keywords

Cosmic string, Monopole, Topological defects